MOJAVE RIVER VOLE
Microtus californicus mohavensis

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Management Status: Federal: USFWS Species of Concern; BLM Sensitive
California: Species of Special Concern (CDFG, 1998)

General Distribution:

The Mojave River vole, also referred to as the Mojave River meadow mouse, is one of 17 named subspecies of the California vole, *Microtus californicus* (Hall, 1981). In California, the species ranges throughout the Coast Ranges, the Cascade Range, the Sierra Nevada with the exception of high elevations, the Central Valley, the Transverse Ranges and south into portions of Baja California. The subspecies *mohavensis* occupies moist habitats along the Mojave River. The Owens Valley vole (*M. c. vallicola*) occupies a disjunct range in the Owens Valley and is also considered a California Species of Special Concern. The Armargosa vole (*M. c. scirpensis*) occupies a small, disjunct range along the Amargosa River in the vicinity of Shoshone and Tecopa, and is listed as Endangered under both the State and Federal Endangered Species Acts.

Distribution in the West Mojave Planning Area:

The range of *M. c. mohavensis* is entirely within the West Mojave Management Plan area. The species is restricted to moist habitats along the Mojave River between Victorville and Helendale. Appropriate habitat may also exist upstream of Victorville towards Hesperia (Williams, 1986). The Mojave River vole may intergrade with the Southern California vole (*M. c. sanctidiegi*) near the headwaters of the Mojave River (Kellogg, 1918; Zeiner, et al., 1990). California voles have been captured at other locations in the western Mojave Desert, including Harper Lake (NDDB), Edwards Air Force Base near Piute Ponds and Rogers Dry Lake (Mitchell, et al., 1993), and China Lake Naval Air Weapons Station, (Kohfield, pers. comm). However, without phylogenetic analysis, it is premature to assign these specimens to a particular subspecies.

Natural History:

The Mojave River vole is a large microtine, measuring 190-214 mm (7.5-8.4 inches) in total length (Kellogg, 1918). The pelage is brown overlaid with longer black hairs above, grayish below. The feet are paler than the rest of the body. The tail is distinctly bicolored; black above, brown below, and averages one-third of the length of the head and body. The eyes are small and the ears are inconspicuous and fur-covered. *M. c. mohavensis* differs from *M. c. sanctidiegi* by darker pelage, smaller ears, and a shortened terminal loop on the third molar (Kellogg, 1918). *M. californicus* can be distinguished from all other members of the genus by the shape of the incisive foramen (Ingles, 1965). However, no other microtines are sympatric with the Mojave river vole.

Mojave River voles construct runways in grassy habitats by clipping vegetation. These runways often lead to shallow burrows in friable soil. Little specific information regarding the natural history of *M. c. mohavensis* is available, and much of the following is taken from accounts of other subspecies. California voles are active diurnally and nocturnally year-round. They forage primarily on the stems and leaves of grasses and forbs, but will switch to grass seeds during the drier parts of the year (Batzli and Pitelka, 1971). Peaks in reproductive activity correspond to times when food and cover are abundant. The gestation period averages 21 days, and litter size ranges between 1 and 11 (Gill, 1979). California voles are a prey species for a variety of predators including diurnal and nocturnal raptors, mammalian carnivores and snakes.

Habitat Requirements:

The Mojave River vole is found in moist habitats including meadows, freshwater marshes and irrigated pastures in the vicinity of the Mojave River. Suitable habitat is associated with ponds and irrigation canals along with the Mojave River proper. Alfalfa fields may also provide habitat (Williams, 1986), although this has not been confirmed. Elevations of known localities range between 750-823 meters (2325-2700 feet).

The closely related Amargosa vole (*M. c. scirpensis*) has been found in marshy areas that are subjected to annual flooding as well as riparian-associated habitats that can provide refuge during annual flooding. They also utilize adjoining upland habitat during unusually high water levels (Thelander et al., 1994).

Population Status:

The current population status of the Mojave River vole is unknown. The amount of freshwater marsh and meadow habitat along the Mojave River has decreased as the result of agricultural and urban development. The rapid development of the Victorville/Apple Valley/Hesperia area has taken place in the historic core area of the subspecies. The Mojave Narrows Regional Park is the only protected land in this core area. To make a better determination of its current population status, updated information regarding the amount of potential and occupied habitat is needed.

Threats Analysis:

The primary threats to the Mojave River vole are the destruction and fragmentation of habitat resulting from agriculture and urbanization. Urbanization adjacent to the Mojave River restricts the availability of upland habitat that may be critical during flood events. Agricultural development affects this subspecies by removing and modifying native habitats. Channelization of surface water and pumping of ground-water may continue to be a significant threat along the Mojave River. Introduction and spread of salt cedar (*Tamarix* sp.) displaces native plants and alters the composition and structure of native plant communities. Competition from introduced house mice (*Mus musculus*) has been identified as a threat to the closely related Amargosa vole (CDFG, 1992). Concentrated off-highway-vehicle use and other surface-disturbing activities also threaten *M. c. mohavensis* by removing vegetation required for foraging and cover. The restricted range of this subspecies makes it susceptible to natural stochastic events such as flooding and drought, and the genetic and demographic consequences of small populations.

Virtually all of the potential habitat along the Mojave River, with the exception of the Mojave Narrows Regional Park, is in private ownership.

Biological Standards:

More detailed data regarding the current distribution, habitat associations and taxonomic relationships of the Mojave River vole is necessary to formulate specific protective measures. However, due to its extremely restricted range, acquisition and conservation of existing, occupied habitat is imperative. Preservation of habitat in the vicinity of known populations in Victorville, Oro Grande and Helendale is essential. All appropriate habitat, especially the meadows and marshes located between Hesperia and Barstow should be identified, mapped and surveyed to determine presence of the species. The taxonomic relationship between *M. c. mohavensis* and other subspecies, including *M. c. sanctidiegi* and *M. c. kernensis* should be determined. Reproductive isolating measures have developed between other subspecies of *M. californicus* that prevent interbreeding (Gill, 1979), and the degree to which the Mojave River vole is reproductively isolated should be determined. The taxonomic relationships of California voles inhabiting Harper Lake, Edwards Air Force Base and China Lake Naval Weapons Station should be analyzed.

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